



VX002160

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of:

Inventor(s) : Kiwamu TAKEHISA et al.
Serial Number : 09/608,964
Filed : June 30, 2000
For : ULTRA-NARROW BAND FLUORINE LASER
: APPARATUS
Examiner : Jose R. Diaz
Group Art Unit : 2815

RULE 132 DECLARATION

Honorable Commissioner
of Patents and Trademarks
Washington, D.C. 20231

Dear Sir:

Mr. Osamu WAKABAYASHI, residing at Kabushiki Kaisha Komatsu Seisakusho, 1200 Manda, Hiratsuka-shi, Kanagawa, Japan hereby states and declares as follows:

1. He graduated from Saitama University in 1981 with a BA, received his MA from Tokyo Institute of Technology in 1983 and his PhD from Kyushu University in 2003; he began working at Komatsu Ltd. in 1983 firstly in area of the design of thermal apparatus, and since 1985 he has in worked in the area of design of excimer laser at Komatsu Ltd.

2. He is an expert in the area of laser technology including KrF-excimer lasers, ArF-excimer lasers, and fluorine

lasers (F₂-lasers), he was an inventor for numerous U.S. patents in this area, and he has read and understood the following U.S. patents:

4,856,018 of Nozue et al., issued August 8, 1989

(hereinafter referred to as the "Nozue patent"). He is one of the inventors of the Nozue patent and thus is intimately familiar with its contents including the specification and claims.

5,303,254 of Szatmari, issued April 12, 1994

(hereinafter referred to as the "Szatmari patent").

5,642,374, of Wakabayashi, issued July 24, 1997

(hereinafter referred to as the "Wakabayashi patent"). He is one of the inventors of the Wakabayashi patent and thus is intimately familiar with its contents including the specification and claims.

6,154,470 of Basting et al., issued November 28, 2000

(hereinafter referred to as the "Basting patent").

3. He has read and understood the specification and claims of U.S. serial No. 09/608,964, filed June 30, 2000, by Kiwamu TAKEHISA et al., entitled Ultra-Narrow Band Fluorine Laser Apparatus.

4. In the area of laser technology, the identifications of "KrF-excimer lasers," "ArF-excimer lasers," and "fluorine lasers (F₂-lasers)" are well-established and refer to different

technologies. In particular, "fluorine lasers" function and operate differently from a KrF-excimer lasers and ArF-excimer lasers and the identity and names of these different types of lasers devices have established an exclusive identity in the art. For these reasons, in his opinion, when one of ordinary skill in the art describes a "fluorine laser," those persons skilled in the art understand that the laser is operated only with fluorine gas as a reactive gas and the laser gas does not contain the rare gases of Kr and Ar, which are respectively contained in the laser gas of KrF- and ArF-excimer lasers.

5. As explained in the Basting patent at column 8, lines 54-56, fluorine lasers can typically operate at a total pressure of approximately 5 bars (4.93 atm). This total pressure for fluorine lasers is higher than that typically used for KrF- and ArF-excimer lasers. While the Basting patent describes a total pressure of less than 5 bars at column 2, lines 29-34, those persons skilled in the art realize that this means a total pressure of slightly less than 5 bars, and certainly nothing lower than 4.8 bars (4.74 atm). There is no reason provided in the Nozue, Szatmari, Wakabayashi and Basting patents that would motivate the undersigned declarant, in his opinion as one of ordinary skill in the art, to operate a fluorine laser at a total pressure markedly lower than the amount of approximately 5 bars (4.93 atm) for fluorine lasers as described in the patent to

Basting, such as that the 2.8 atm required in the invention claimed in U.S. serial No. 09/608,964

6. When KrF-and ArF-excimer lasers are oscillated, the output spectrum width is about 300 pm, and this spectrum width includes a wide range of wavelengths. This understanding is consistent with the teachings of the Basting patent, which describes that KrF- and ArF-excimer laser systems have a breadth of natural emission spectra that is greater than 100 pm. For these reasons, the undersigned declarant, in his opinion as one of ordinary skill in this art, declares that it is impossible for the teachings of the Wakabayashi patent to suggest controlling the width of the laser beam to anything significantly less than about 300 pm, and that these teachings certainly cannot suggest that it is possible within the teachings of the Wakabayashi patent to control the bandwidth of a laser light to lower than 1 pm, as required in the invention claimed in U.S. serial No. 09/608,964 without the use of optical elements (i.e., gratings and/or prisms). Therefore, the teachings of Wakabayashi patent would not motivate the undersigned declarant, in his opinion as one of ordinary skill in the art, to the invention claimed in U.S. serial No. 09/608,964, which includes narrowing the bandwidth of laser light to lower than 1 pm by maintaining total pressure of the laser gas equal to or lower than 2.8 atm. On the other hand, if the total pressure of the laser gas in the device

proposed by Wakabayashi was maintained equal to or lower than 2.8 atm, it is the undersigned declarant's opinion, as one of ordinary skill in the art, that the bandwidth of the resulting laser beam could not remotely approach 1 pm or lower, as required in the invention claimed in U.S. serial No. 09/608,964.

7. In the undersigned's opinion, the Wakabayashi patent cannot suggest to an artisan in this art that the laser described therein can be operated in a manner to control the bandwidth of a fluorine laser gas to a very narrow bandwidth, such as to about 1 pm or lower without use of an optical element(s). The reasons for this would include the fact that the laser beam proposed by the device of the Wakabayashi patent has a spectrum width of about 300 pm and includes a wide range of wavelengths. In addition, the declarant, in his opinion as one of ordinary skill in the art, would not operate a fluorine laser at a total pressure of 2.8 atm, as required in the claims of U.S. serial No. 09/608,964, based on the discussions in the Wakabayashi patent or based on the general knowledge in this art, because no known advantage can be obtained from this.

8. A significant difference between the Wakabayashi patent and the invention claimed in U.S. serial No. 09/608,964 can be explained by the different terminologies used in the Wakabayashi patent and those used in the claims of U.S. serial No. 09/608,964. The Wakabayashi patent proposes controlling beam

width. A beam or a light beam (beam of light) is a column of light (as from a beacon) or a shaft of light. Such a beam or light beam includes a plurality of wavelengths of light with a wide range of wavelengths that need not be adjacent wavelengths. On the other hand, the claims of U.S. serial No. 09/608,964 are directed to controlling bandwidth, such as a very narrow range light wavelengths of adjacent wavelengths, or an adjacent portions thereof, or possibly a single wavelength of light. Since the teachings of the Wakabayashi patent and the claims of U.S. serial No. 09/608,964 are directed to controlling different types of light and wavelengths structures, the undersigned declarant, in his opinion as one of ordinary skill in the art, would not be motivated to utilize the procedures of the Wakabayashi patent for the different light and wavelength structure (i.e., bandwidth) defined in the claims of U.S. serial No. 09/608,964. A reason for this, in the opinion of the undersigned declarant, is that one of ordinary skill in the art would not expect that the procedures, such as controlling total pressure of gas in the laser chamber, as discussed in the Wakabayashi patent for use in KrF- and ArF-excimer lasers would function or operate in a similar manner for the different light and wavelength structure (i.e., bandwidth) defined in the claims of U.S. serial No. 09/608,964 for a fluorine laser.

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9. He further declares that all statements made herein by his own knowledge are true and that all statements are made on information and belief are believe to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the above-referenced application or any patent issuing therefrom.

July 16, 2004
Date

Osamu Wakabayashi
OSAMU WAKABAYASHI

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